

Appl. No. 10/817,195  
Amdt. dated January 22, 2006  
Reply to Office Action of October 24, 2006

PATENT

**REMARKS/ARGUMENTS**

This Amendment is responsive to the Office Action mailed on October 24, 2006. The due date for response is to and including January 24, 2006, so this response is being timely filed.

In this Amendment, claims 2-3 are canceled and the limitations of all intervening claims are incorporated into independent claim 1. Claims 5, 8, and 16 are amended to improve their form, and claims 21-25 are added so that claims 1 and 4-25 are pending and subject to examination on the merits.

Since independent claim 1 was previously presented as dependent claim 3, the amendment to independent claim 1 does not raise a new issue requiring further search and/or consideration on the part of the Examiner.

At page 2 of the Office Action, the Examiner objects to FIG. 1 since label "20" is not described in the specification. Label "20" refers to "light" and the specification has been amended accordingly.

Also at page 2 of the Office Action, claim 8 is objected to. In response, claim 8 is amended.

**I. 35 USC 102 - King (U.S. 4,114,177)**

Claims 1, 4-6, 8-9, and 11-14 are rejected as anticipated in view of King. This rejection is traversed.

**A. Independent claim 1 and dependent claims 4-6, and 8**

Independent claim 1 has been amended to incorporate the limitation in dependent claim 3 and all intervening claims including the limitation in claim 2. Since dependent claim 3 was not rejected over King, the anticipation rejection of claims 1, 4-6, and 8 over King is obviated.

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B. Independent claim 9 and dependent claims 11-14

The Examiner rejects independent claim 9 and states that "King discloses an optically coupled device comprising: a substrate comprising metallic bonding pads (13, 17) as part of a single planar lead frame (11) as a lead frame and polymeric mass (26) as a molding compound" (see page 4 of the Office Action). The anticipation rejection as to independent claim 9 and dependent claims 11-14 is traversed.

King does not anticipate claim 9 or any claims dependent thereon, since each and every element of claim 9 is not taught or suggested by King. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). MPEP § 2131. Independent claim 9 recites a method for forming an optocoupler package comprising, "(a) forming a substrate comprising a leadframe and a molding compound" and "(b) attaching an optical emitter and an optical receiver to the substrate". At least this combination of steps is not taught in King.

Referring to FIG. 1, King states that a light-emitting diode 12 and a detector 16 are bonded and wirebonded to a planar leadframe 11. Diode 12 and detector 16 are then enclosed in a dome of transparent material 20. "In a later stage of fabrication the device as shown will be potted in a mass of polymeric material [26]" (see c. 2, l. 35-37; and FIG. 2). If the polymeric mass 26 in King is alleged to be the "molding compound" in the claims and is part of the "substrate", then the diode 12 and the detector 16 are not attached to the polymeric mass 26 and the leadframe 11 after the combination of the polymeric mass 26 and the leadframe 11 is formed. Rather, in King, the diode 12 and the detector 16 are first bonded to the leadframe 11, and then the polymeric mass 26 covers the leadframe 11, the diode 12, and the detector 16. Clearly, King does not first form a substrate including a molding compound and a leadframe, and then attach an optical detector and an optical emitter to that substrate. Accordingly, King fails to anticipate or obviate claims 9 and 11-14.

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**II. 35 U.S.C. 103(a) - King**

At page 5 of the Office Action, claims 7 and 15-20 are rejected as obvious over King. This rejection is traversed.

**A. Dependent claim 7**

Applicants submit that dependent claim 7 is allowable, as it depends from novel and unobvious independent claim 1 (as explained below). In addition, claim 7 recites additional feature making it clearly patentable over King.

**B. Independent claim 15 and dependent claims 16-20**

The Examiner states that King does not explicitly disclose the use of a plurality of optocouplers, but suggests at least one semiconductor element for absorbing electromagnetic radiation and producing an output signal. The Examiner also states that even if this does not suggest a plurality of optocouplers, the use of a plurality of optocouplers would have been a "mere matter of duplication of parts" because such would allow for the additional capability of the device and efficient use of the frame 11 in King. This rejection is traversed.

As shown in FIG. 3 of the present application, Applicants' leadframe structure can be processed (e.g., etched) so that it can accommodate multiple optocouplers. As shown in FIG. 3, the leadframe structure is discontinuous and can accommodate two or more optocouplers.

No such configuration is present in King. King basically discloses a single optocoupler and the leadframe 11 in King cannot accommodate multiple optocouplers. Although the Examiner refers to King's statement of "at least one semiconductor element" at column 2, lines 13-16, this passage from King is basically referring to two semiconductor elements (i.e., one diode 12 and one detector 16). King's leadframe is not designed to accommodate multiple diodes, detectors, or optocouplers so King cannot teach or suggest the invention of independent claim 15 or any claims dependent therefrom.

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Applicants submit that using multiple optocouplers within a single package is not a "mere matter of duplication parts". As noted at paragraph [0027] of the specification, in embodiments of the invention, a single optocoupler package can provide the same or improved performance over multiple (e.g., four) optocoupler packages. This allows for a simpler motherboard design and also saves space on the motherboard. These advantages are also not taught or suggested by King. Accordingly, Applicants submit that independent claim 15 and any claims dependent therefrom are patentable.

**II. 35 U.S.C. 103(a) - King and Lorenz et al. (U.S. 6,324,072)**

**A. Independent claim 1 and dependent claim 10**

Dependent claims 2-3 and 10 are rejected over the combination of King and Lorenz et al. As noted above, claims 2-3 are canceled and the limitations in these claims are now in independent claim 1.

The Examiner states that King does not disclose the use of conductive structures coupled to a lead frame. However, the Examiner states that Lorenz et al. disclose the use of electrically conductive balls 8. The Examiner further alleges that it would have been obvious to modify the teachings in King with conductive balls 8 "because it would allow for ease of installation and additional electrical processing capabilities". The rejection is traversed.

Previously submitted dependent claim 3 and pending independent claim 1 are not obvious in view of King and Lorenz et al., because all limitations are not taught or suggested by these references. To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). MPEP § 2143.03. Previously submitted dependent claim 3 and independent claim 1 recite "wherein the optocoupler package further comprises a plurality of conductive structures coupled to the leadframe, wherein the conductive structures have heights greater than the heights of the optical receiver and the optical emitter, and wherein the conductive structures are solder structures". As shown in FIG. 9 of the present application, the solder

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structures 25 are taller than the optical emitters and receivers 26, 27 so that the package can be flip chip mounted to a circuit board (see FIG. 11). This limitation is neither taught nor suggested by either King or Lorentz et al.


As noted by the Examiner, King does not disclose conductive structures comprising solder at all. While Lorentz et al. discloses conductive balls 8, the conductive balls 8 clearly do not have heights greater than an optical emitter, optical receiver, or even the surface mounted device 11 that is specifically disclosed in Lorentz et al. The Office Action does not state where Lorentz et al. teaches or suggests "conductive structures [that] have heights greater than the heights of the optical receiver and the optical emitter, and wherein the conductive structures are solder structures." Since neither King nor Lorentz et al. teach or suggest all limitations in the claims, obviousness has not been established.

#### CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 415-576-0200.

Respectfully submitted,



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